UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

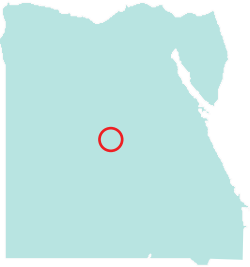
Industrial Energy Efficiency Project

In order to introduce a structured approach to energy management in their operations, Building Materials Industries Company (BMIC) has joined hands with the GEF funded project, "Industrial Energy Efficiency in Egypt." This project is implemented by the UNIDO in partnership with the Egyptian Environmental Affairs Agency, Ministry of Industry, Trade and SMEs and the Federation of Egyptian Industries. The project has helped BMIC to implement an Energy Management System in alignment with ISO 50001 for an overall improvement in energy efficiency and improve environmental impact.

EGYPT

A Case Study of BMIC

BMIC Snapshot



Industry: Cement
Location: Assuit, Egypt
Product: Ordinary Portland Cement (OPC), Sulfate Resistant Cement (SRC).
Implementation cost: No cost
EnMS scope: Electricity
Annual energy savings: ~2.4 GWh
Financial savings: ~975,000 EGP
GHG reduction: ~1.4 kCO_2eq
Overall payback: Immediate
Objectives period: 3 years
Time to implement EnMS: 1 year

BMIC currently serves the market with high-quality Ordinary Portland Cement (OPC) and Sulfate Resistant Cement (SRC) with a total production capacity exceeding 1.5 Million ton cement p.a.

Implementing EnMS in Egypt is the way out

BMIC were keen on committing to managing their energy consumption from a very early stage in their plant's life. Even before reaching the production design capacity, with support from UNIDO, BMIC has started working on the implementation of an EnMS complying with ISO 50001. Even though this has proven to be challenging with the lack of historical production and consumption data, BMIC has made sure to have the main element of an EnMS in place. This enthusiasm was driven by a strong management commitment to ensure competitiveness and more sustainable approach to the company's production operations.

BMIC ambitious EnMS objectives

BMIC assigned its EnMS objectives with an approach of applying energy efficiency measures in order to improve facility-wide energy performance. In this context, BMIC's objective is to reduce 9% of their electrical consumption by EOY 2017.

UNIDO, a key player in the plant's success

With UNIDO's support, BMIC staff was engaged in a thorough process to review and analyze the company's existing energy consumption and performance. Throughout the process, BMIC staff was able to develop an accurate energy baseline and Energy Performance Indicators (EnPIs) for the plant's significant energy users. In addition, energy saving opportunities were also identified and implemented. The EnPIs that were set, were used in the monitoring and verification of the implemented measures.

Saving opportunities achieved

Identified Energy Saving Opportunity Measures
Reduction of the particle size of raw material.
Optimization of the cement mill grinding media
Optimization of the raw material composition
Replacing the feed motor driver
Modifying the final product specifications
Optimize the cooler bed by using better raw material quality
Automation of all PID controllers
VRM energy consumption optimization
Minimization of false air in the VRM
Maintenance of VRM outlet gas duct
Replacement of roller and table segment plates in the VRM

Reduction of the particle size of raw material
To achieve a reduction in raw material particle size, the crusher blow bars were replaced by a new set.

Optimization of the cement mill-grinding media
A detailed assessment was carried out to identify the optimum mill grinding media. The optimization of the cement mill grinding through the proper selection of grinding media has proven to have a significant impact on energy performance and hence material has been gradually substituted until the highest energy efficiency is achieved.

Optimization of the raw material composition
Raw material composition was modified to ensure that sand is removed from the new clay composition. This was achieved through testing three different clay quarries until a balance was reached between results of chemical analysis and energy consumption.

Raw Mill main motor Replacing
The new feed motor driver has allowed an increase in consumption, which has accounted for a lower baseload. As a result, the feed rate has increased by an additional 50 ton/hr.

Modifying the final product specifications
Optimization of the final products specs was carried out to ensure the best energy efficiency levels while maintaining a high quality product in accordance with these standards.

Optimization of the cooler bed
The cooler bed energy consumption was reduced with better raw material quality.

VRM energy consumption optimization
Energy consumption in the Vertical Rolling Mill was optimized through the minimization of false air by welding and fixing a new shell lining plate and air duct repairs. Also, old roller and table segment plates were replaced. This has reduced SEC by 2 kWh/ton.

Barriers

The implementation of an EnMS at BMIC faced many barriers and obstacles. The main barrier was that implementation started at very early stage of the plant life. This has resulted in the unavailability of enough historic data to develop the baseline and hence has resulted in a slow implementation process. In addition, for the same reason, the data available did not represent a steady state and therefore there were doubts around the energy performance indicators and the energy baseline. In addition, the unstable operation was prolonged due to the energy supply shortages that was faced by most of the energy-intensive industries at the time.

However, it was possible to develop an accurate baseline and EnPIs by using daily-recorded data as soon as the plant reached a steady operational state. Some elements of an EnMS are still not institutionalized but BMIC management is keen on fully complying with ISO 50001 requirements as significant energy savings have already been achieved.

Lessons Learned

The implementation of the EnMS at BMIC has proven that even in cases where the company is facing significant challenges and barriers, it is still possible that the company achieves significant savings if a thorough energy review was carried out. Furthermore, the implementation at BMIC has also proven that regardless of the plant's age, it is still possible to achieve significant savings through a systematic approach.

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